

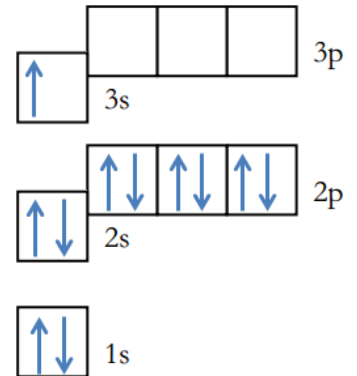
Unit 8: Ionic Compounds *Notes and Practice*

What is **BONDING**?

_____ that hold atoms together to form compounds.

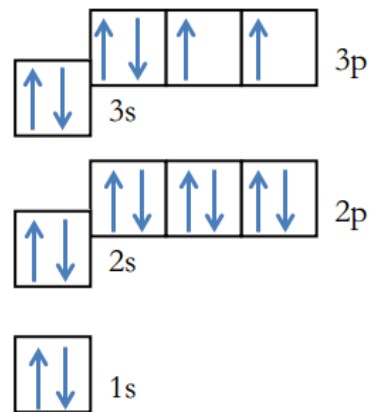
POSITIVE ION FORMATION

- _____ tend to _____ valence e⁻.
- A _____ charged ion is called a _____.
- Ex. Na → _____
 - will lose _____
 - Na⁺ → _____



NEGATIVE ION FORMATION

- _____ tend to _____ valence e⁻.
- A _____ charged ion is called an _____.
- Ex. S → _____
 - will gain _____
 - S²⁻ → _____



IONIC SIZE

- Cations are always _____ than the atoms from which they formed
 - Fewer electrons so the protons can pull the electrons closer
- Anions are always _____ than the atoms from which they form
 - More electrons and the same number of protons

IONIC BONDS

- _____ atoms will _____ electrons to _____ atoms, causing both to become ions.
- An _____ is the force of attraction that holds _____ together in _____.

FORMULAS FOR IONIC COMPOUNDS

- The chemical formula for an ionic compound is called a _____ and represents the _____ of the ions in a compound.
- Ionic compounds are _____ (charge = ____)
- The _____ tell chemists how many _____ of each _____ are present in the compound.
 - Example: _____ means ____ aluminum atoms and ____ sulfur atoms in one "formula unit".
- How to write ionic formulas:
 1. Write the _____ for each ion and its _____
 2. _____ the charges with _____
 - Total ____ charge of _____ must = total ____ charge of _____
 - "Criss-cross" or "swap"
 3. Re-write the _____ without any _____.
 - Metal (cation) is ALWAYS _____ and the nonmetal (anion) is _____.
- Write the formula for
 1. Calcium iodide
 2. Potassium phosphide

NAMING IONIC COMPOUNDS

- Name the metal (cation) and name the nonmetal (anion), changing the ending to "ide"
- Name the following ionic compounds...
 1. NaF
 2. Al_2O_3

TRANSITION METAL IONIC COMPOUNDS

- Transition metals form _____ cations.
- Different _____ results in different _____ and different _____.
- A _____ is used to indicate the _____ of a metal that forms multiple cations.
 - Iron is commonly found as both _____, which is called _____ and _____, called _____.
 - _____ is called _____ & _____ is called _____.
- Write the formula for:
 1. Iron (II) Oxide
 2. Cobalt (II) Iodide
 3. Vanadium (III) Oxide

Naming

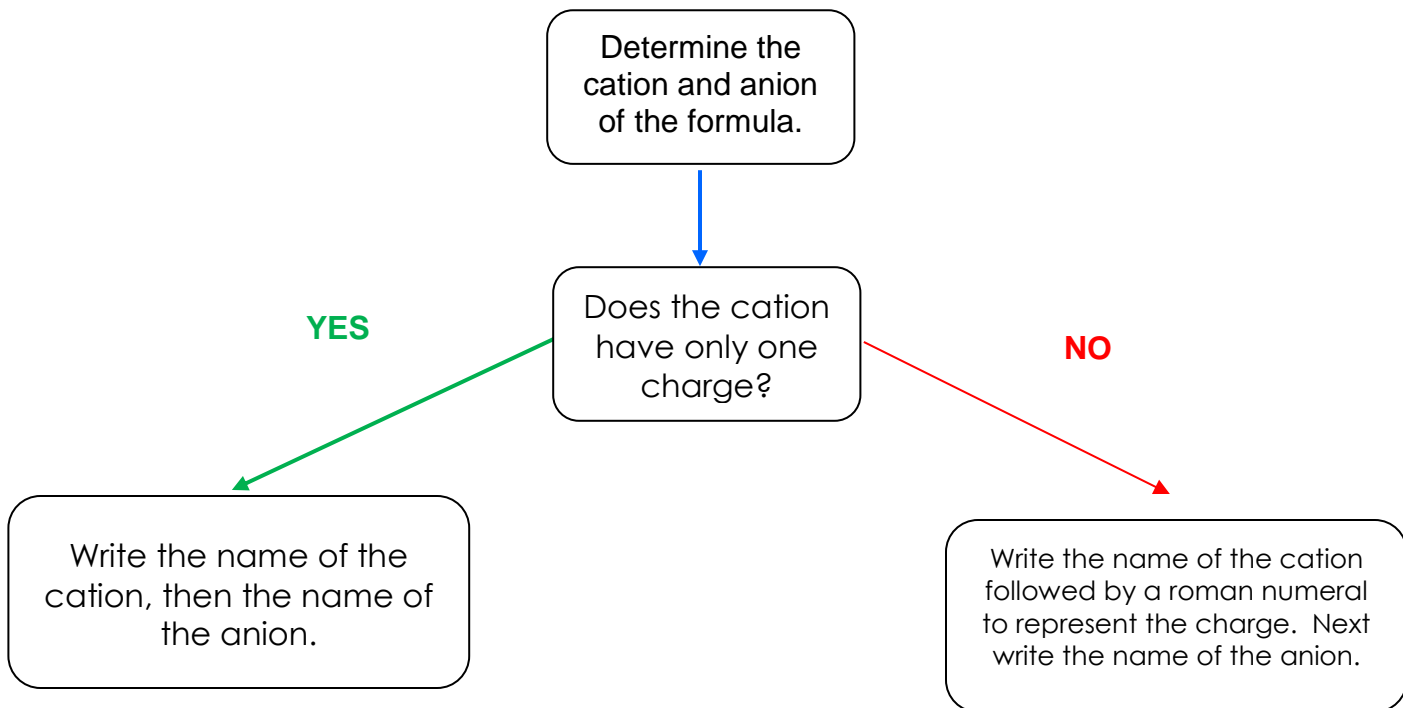
- You must write a roman numeral in _____ after the _____ of the _____ to show the _____ charge on the _____.
- Exceptions:
 - _____ is always a _____ ion
 - _____ is always a _____ ion
 - _____ and _____ can be a _____ or _____ ion.

DON'T need Roman Numerals

MUST have Roman Numerals

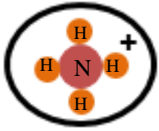

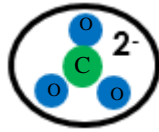

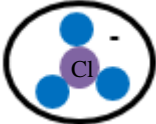
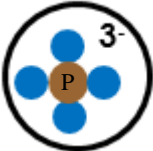

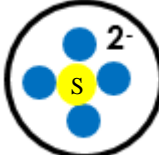


MEMORIZE THEM!!!!

Name the following compounds...



POLYATOMIC ION COMPOUNDS

- Polyatomic ions are...
- Charge applies to the _____
- Acts as an _____ ion in a compound

Polyatomic Ions					
Name	Formula	Particle Diagram	Name	Formula	Particle Diagram
Ammonium			Nitrate		
Carbonate			Nitrite		
Chlorate			Phosphate		
Cyanide			Sulfate		
Hydroxide			Sulfite		

Formula Writing

- NEVER _____ subscripts of the atoms _____ the poly
- NEVER _____ the poly
- If _____ poly is needed, place parentheses _____ the ion and a subscript _____
- Example: NH_4^+ and O^{2-} →

Naming

- Example: NaOH →

PROPERTIES OF IONIC COMPOUNDS

- _____, rigid, _____
- _____ - _____ as solids
- Conduct electricity when _____ (aqueous solution)
 - A substance will conduct electricity if it has _____.
 - Ionic solids have a _____ structure, however, when dissolved in water, the ions _____ and are mobile allowing the conduction of electricity.
- Ionic solids have _____ melting and boiling points due to the _____ attraction between the (+) and (-) ions.
 - The _____ the temperature, the _____ the force of attraction.
 - _____ ions are _____ together than larger ions producing a _____ attraction.
Ex: KBr vs. NaCl
 - _____ charges have a _____ attraction.
Ex: NaBr vs. MgO

Compound	Melting Point (°C)	Boiling Point (°C)
<u>KBr</u>	734	1435
<u>NaBr</u>	747	1390
<u>NaCl</u>	801	1413
<u>MgO</u>	2852	3600

Practice

Ionic formulas and names for binary (2 types of atomic) ionic compounds with metals that only form 1 ion

1. LiF _____
2. lithium chloride _____
3. BBr₃ _____
4. aluminum chloride _____
5. Li₃P _____
6. beryllium fluoride _____
7. BeO _____
8. Aluminum sulfide _____
9. BCl₃ _____
10. lithium nitride _____
11. Na₂S _____
12. boron oxide _____
13. AlN _____
14. Beryllium sulfide _____

Ionic formulas and names for binary ionic compounds with metals that form multiple ions

15. CuCl_2 _____

16. copper (I) chloride _____

17. Cu_2O _____

18. tin (IV) oxide _____

19. Cu_3N _____

20. copper (II) nitride _____

21. SnSe _____

22. copper (II) oxide _____

23. PbF_4 _____

24. lead (II) fluoride _____

25. PbS _____

26. lead (IV) sulfide _____

27. Pb_3N_4 _____

28. chromium (VI) phosphide _____

29. FeF_3 _____

30. iron (II) bromide _____

31. Fe_2O_3 _____

32. lead (IV) oxide _____

Ionic formulas and names for ionic compounds containing polyatomic ions

33. NH_4Cl _____

34. beryllium chlorate _____

35. LiClO_3 _____

36. barium nitrate _____

37. BeSO_4 _____

38. aluminum hydroxide _____

39. CaSO_3 _____

40. calcium sulfate _____

41. $(\text{NH}_4)_3\text{N}$ _____

42. calcium phosphate _____

43. NH_4NO_3 _____

44. cesium cyanide _____

45. NH_4NO_2 _____

46. sodium nitrate _____

47. $\text{Sr}_3(\text{PO}_4)_2$ _____

48. sodium nitrite _____

49. KClO_3 _____

50. calcium carbonate _____

Polyatomic Ions				
Chlorate ClO_3^-	Cyanide CN^-	Nitrate NO_3^-	Hydroxide OH^-	Sulfate SO_4^{2-}
Carbonate CO_3^{2-}	Ammonium NH_4^+	Nitrite NO_2^-	Phosphate PO_4^{3-}	Sulfite SO_3^{2-}

